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(54) Labelling of compact discs

(57) Discs 8 carrying optically coded information 4 with a reading side and an obverse non-reading side have a label 7, in the form of an annular, information carrying, sheet of material adhesively secured to the surface of the non-reading side. The label 7 may be an annular sheet of paper carrying printed information, illustrations and/or machine readable information. The label may be printed by offset lithography or directly printed from a computer using ink jet, bubble jet or other non-impact printing method. Preferably the printing is carried out on paper or other sheet stock that has been pre-coated on the unprinted side with a contact adhesive protected by a peelably removable cover sheet. The label may include a hologram or be formed using a hologram carrying sheet and may carry raised characters formed by embossing or other means. Prior to or during the application of the label to the obverse non-reading side of the disc a security device can be placed on the disc which is held securely in position and concealed by the applied label. The security device can be used to prevent removal of a disc from a secure area, encoded to provide source and other identification data relating to the disc or to interact with reader interrogation systems to prevent unauthorised reading or copying.

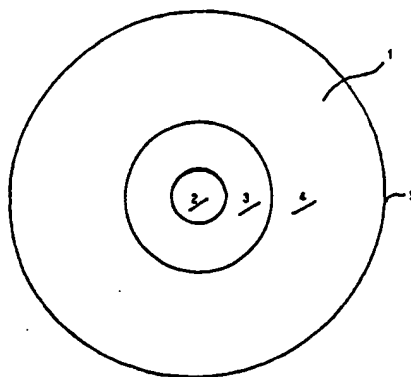


FIGURE 1

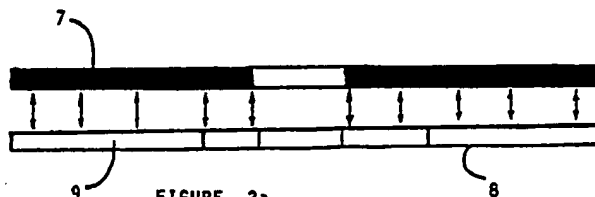


FIGURE 2a

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

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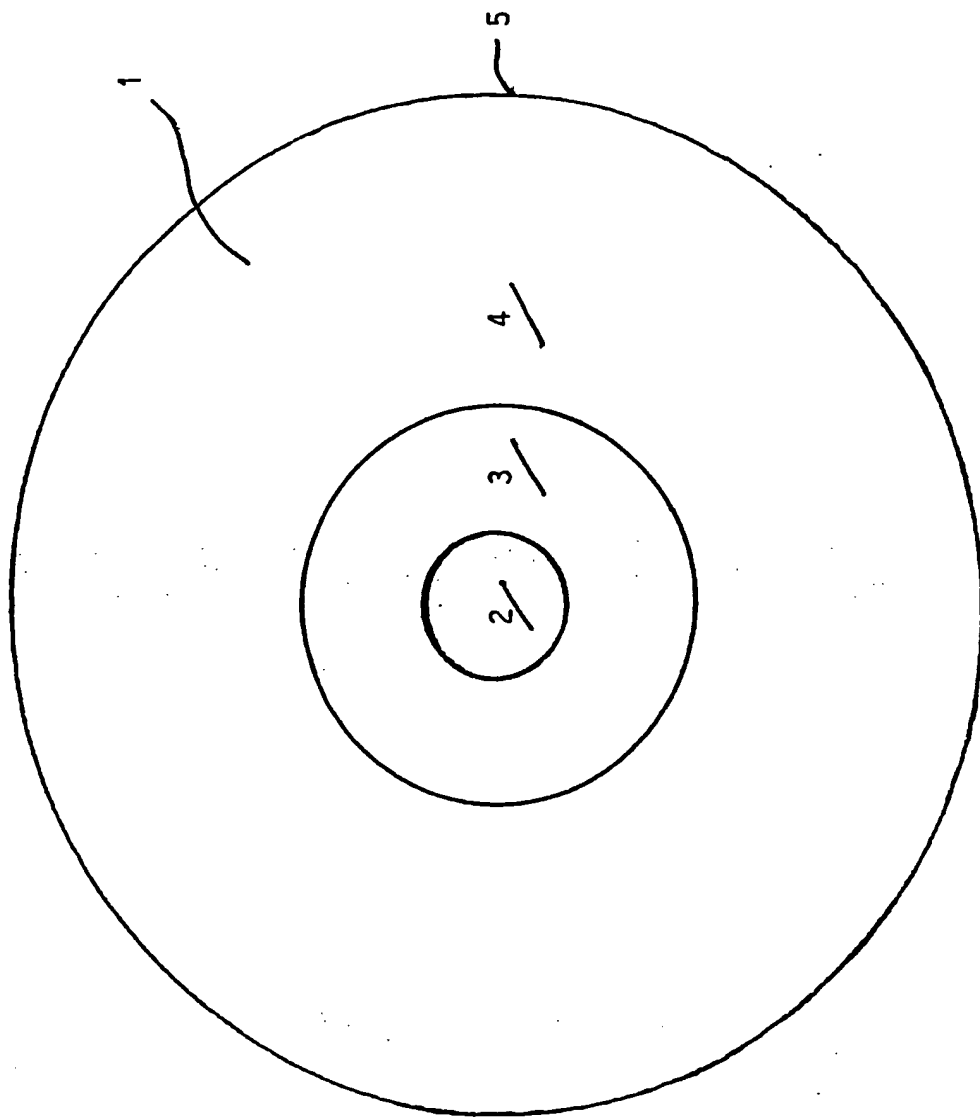


FIGURE 1

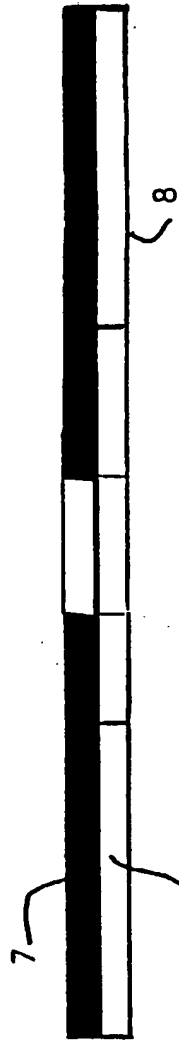


FIGURE 2b

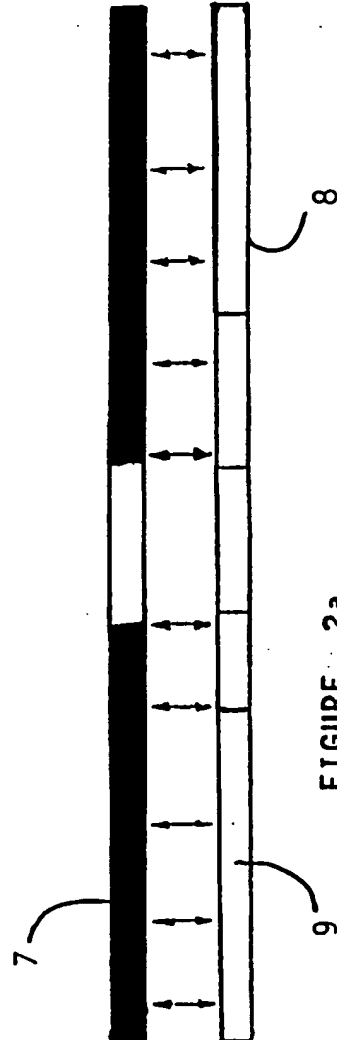


FIGURE 2a

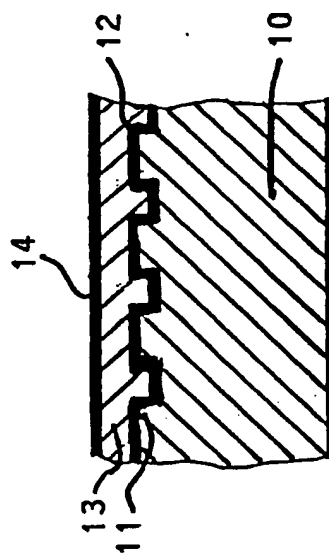


FIGURE 3

LABELLING SYSTEM FOR DISCS CARRYING AUDIO AND VIDEO
INFORMATION

This invention relates to a labelling system for discs
5 carrying audio and video information, often called 'compact
discs' or CD ROMs.

Information, musical works and video images are often
optically recorded in digital form at high density as
10 spiral tracks on disc-shaped recording media. The digital
information is stored in the form of areas having differing
reflectance properties. The digital information is read
from the discs as variations in the reflected radiation
received from a fine beam of light or infra-red radiation
15 which is directed to and follows a recorded track of
digital information as the disc rotates. The recorded
information is physically in the form of small indentations
in the disc surface. The recordings may be formed
directly on the surface of suitably sensitised discs or, if
20 larger numbers are to be produced, by pressing from a
master disc on to a disc-shaped transparent substrate to
form a corresponding pattern of indentations. The
recordings are customarily read by reflectance through one
side of the transparent substrate. The obverse side,
25 initially carrying the data indentations, is coated with a
reflective layer to assist reading, and a protective laquer
layer so that the final surface is substantially flat.

Marking means, to provide identification of the contents of
30 the disc without affecting the ability to read the stored
information, is customarily formed on the obverse, non-
reading side of the disc.

The laquer surface of the non-reading side of a recorded
35 disc tends to be hydrophobic and to reject water based

inks. For this reason it has been customary to print information on the discs by means of the silk screen process. This is an elaborate process which requires considerable time to set up and is expensive to use on
5 small numbers of discs, e.g. less than 1000, particularly when multi-colour printing is required. Furthermore, contamination of the reading side of the disc can easily occur corrupting the information read from the disc. As a necessity therefore the printing process must be carried
10 out under 'clean room' conditions. Particular care must be taken to ensure that no ink particles reach the surface of the reading side of the disc as they will adhere to it permanently and destroy the integrity of data read from it.

15 The present invention provides a method of marking discs carrying optically coded information in digital form which is inexpensive and may be used economically on small runs of discs. The method also provides means for improving the security of the recorded information against copying or
20 unauthorised use.

According to the present invention there is provided a method of marking discs carrying optically coded information with a reading side and an obverse non-reading
25 side, characterised in that a label, in the form of an annular, information carrying, sheet of material is adhesively secured to the surface of the non-reading side.

In one embodiment the label is an annular sheet of paper
30 carrying information and/or illustrations printed by offset lithography. This is a simple and inexpensive method of printing which may be carried out in an area separate from that containing recorded discs so that contamination of the discs is avoided. In a preferred embodiment the printing
35 is carried out on paper or other sheet stock that has been

pre-coated on one side with a contact adhesive and which has been protected by a peelably removable cover sheet. The required annular shape of the label may be formed by pre-punching the necessary circular dimensions before or after printing in known manner. As well as information that can be read directly the label may carry illustrations, bar codes, or other machine readable information. To enhance security or for artistic effects the label may include a hologram or be formed from a hologram carrying sheet.

The method of marking discs according to the invention can be used economically on small runs, e.g. 100 or so, discs which have been manufactured by direct recording rather than pressing. For very small runs, e.g. 10 or so the labels may be directly printed from a computer using ink jet, bubble jet or other, preferably non-impact, printing method. The labels may also carry raised characters formed by embossing or other means to enable the carried information to be read by blind or partially sighted users.

The physical dimensions of recorded discs conform to standards laid down on the basis of the reading devices in which they are to be used. There is normally a central aperture to receive the spindle of the reader and a peripheral area used to clamp the disc to the rotating spindle. There is also an outer border near the rim of the disc which is free of recorded information. The area between the clamping area and the border carries recorded information and is traversed by the reading device while the disc rotates. The diameter of this aperture and the overall diameter of the disc set the limits of the inner and outer diameter of the annular label.

Prior to or during the application of the label to the base

surface of the disc a security device can be placed on the disc which is held securely in position by the label.

Many small types of passive security devices are known which may be used satisfactorily beneath the labels. The devices may be used to prevent removal of a disc from a secure area, encoded to provide source and other identification data or to interact with reader interrogation systems to prevent unauthorised reading or copying. In many embodiments the presence of a security device will not be apparent from the external appearance of the disc.

The adhesive used to hold the label to the disc surface is preferably solvent free and, apart from being adhesively compatible, must not interact with the laquer substrate.

In a most preferred embodiment, before or after the label has been applied to the disc, a transparent protective film is laminated to the printed surface. Such a film layer prevents degradation of the printed matter or illustrations by moisture and/or abrasion.

The invention provides an economic method of applying identification labels and security markings to discs carrying optically coded information.

In order that the invention may be clearly understood it will now be described with reference to the accompanying drawings in which:

Figure 1 shows a plan view of a disc carrying optically coded information for use in the method of the invention,

Figure 2a shows a cross-sectional view of the label illustrated in Figure 1 prior to lamination,

Figure 2b shows a cross-sectional view of the label illustrated in Figure 1 after lamination, and

Figure 3 shows an enlarged cross-sectional view of part of

an information carrying disc showing the relationship between the recorded data, substrate and label.

5 A disc carrying optically coded information 1, see Figure 1, has a centrally located aperture 2 to receive the spindle of a disc reader. An inner annular portion 3 is reserved for the clamping mechanism that engages the disc with the rotating spindle and a buffer area. After the annular area 3 there is an information area 4 carrying the
10 information recorded in digital form which can extend up to the edge 5 of the disc 1. Preferably the annular label according to the invention covers at least all the information area 4 on the non-reading side of the disc.

15 For audio discs the aperture 2 has a diameter of 15 mm, the annular area between the aperture 2 and the information area 4 has an outer diameter of 44 mm. The information area extends from the boundary of the area 4 up to the edge of the disc. The overall diameter of the disc is 120 mm.
20 Other audio discs have an overall diameter of 80 mm and for computer CDROM and video discs other standards may apply.

A label 7, see Figure 2a, is located concentrically above or below a disc 8. The surface of the disc 8 adjacent to
25 the label 7 will be the non-reading side of the disc. After pressure and/or vacuum the label 7 is laminated to the disc 8 and covers the information area 9 on the non-reading side, see Figure 2b. The thickness of the label 7 will depend upon the nature of the material used to
30 carry the printed or other information. The range of thicknesses extends from 70 to 700 micrometres. The labelled disc 8 has a thickness of 1.2 mm.

The construction of a labelled disc is shown in greater
35 detail in Figure 3. The base of the disc is formed from a

substrate 10 of a polycarbonate resin. Indentations 11 are formed under the influence of pressure and temperature from a master disc. The indentations 11 carry a coating 12 of aluminium deposited under vacuum on the pressed disc.

5 The irregular surface provided by the indentations 11 is rendered level and the indentations protected by a layer of laquer 13. The layer is formed from a liquid photopolymerisable composition coated over the layer 12 and cured by exposure to appropriate actinic radiation. A label 14 is

10 adhesively secured to the layer 13 as previously described. For security purposes a device may be placed on the layer 13 before lamination with the label 14.

Passive security devices suitable for locating below the

15 label on discs according to the invention are well known. The devices may comprise a planar tuned circuit, a semiconductor mixer, interrogatable ROM or other known device.

CLAIMS

1. A method of marking discs carrying optically coded information with a reading side and an obverse non-reading
5 side, characterised in that a label, in the form of an annular, information carrying, sheet of material is adhesively secured to the surface of the non-reading side.
2. The method as claimed in claim 1, characterised in
10 that the label is an annular sheet of paper carrying printed information and/or illustrations.
3. The method as claimed in claim 2, characterised in
that the label is printed by offset lithography.
- 15 4. The method as claimed in claim 2, characterised in that the label is directly printed from a computer using ink jet, bubble jet or other non-impact printing method.
- 20 5. The method as claimed in any of the claims 2 to 4, characterised in that the printing is carried out on paper or other sheet stock that has been pre-coated on the unprinted side with a contact adhesive protected by a peelably removable cover sheet.
- 25 6. The method as claimed in any of the claims 2 to 5, characterised in that the required annular shape of the label is formed by pre-punching the necessary circular dimensions before or after printing.
- 30 7. The method as claimed in any of the preceding claims, characterised in that the label carries illustrations, bar codes, or other machine readable information.

8. The method as claimed in any of the preceding claims, characterised in that the label includes a hologram or is formed using a hologram carrying sheet.

5 9. The method as claimed in any of the preceding claims, characterised in that the label carries raised characters formed by embossing or other means.

10 10. The method as claimed in any of the preceding claims, characterised in that prior to or during the application of the label to the obverse non-reading side a security device is placed on the disc which is held securely in position by the applied label.

15 11. The method as claimed in claim 10, characterised in that the security device is used to prevent removal of a disc from a secure area, encoded to provide source and other identification data relating to the disc or to interact with reader interrogation systems to prevent
20 unauthorised reading or copying.

12. The method as claimed in any of the preceding claims, characterised in that the adhesive used to secure the label to the disc surface is solvent free and does not interact
25 with any laquer substrate beneath it.

13. The method as claimed in any of the preceding claims, characterised in that before or after the information carrying sheet has been applied to the disc a transparent
30 protective film is laminated to the information bearing surface.

14. Methods of marking discs carrying optically coded information as claimed in claim 1 and as herein described.

15. Methods of marking discs carrying optically coded information as herein described with reference to the accompanying drawings.

5 16. Discs carrying optically coded information with a reading side and an obverse non-reading side, characterised in that a label, in the form of an annular, information carrying, sheet of material is adhesively secured to the surface of the non-reading side.

10

17. Discs carrying optically coded information whenever made by the method of any of the claims 1 to 15.

15

Relevant Technical Fields

- (i) UK Cl (Ed.N) B8F (FBG), G5R (RB21, RB26, RHD)
(ii) Int Cl (Ed.6) G11B 23/40

Databases (see below)

- (i) UK Patent Office collections of GB, EP, WO and US patent specifications.

- (ii) ONLINE: WPI

Search Examiner
STEPHEN SMITH

Date of completion of Search
10 JULY 1995

Documents considered relevant
following a search in respect of
Claims :-
1 TO 17

Categories of documents

- X:** Document indicating lack of novelty or of inventive step. **P:** Document published on or after the declared priority date but before the filing date of the present application.
Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. **E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.
A: Document indicating technological background and/or state of the art. **&:** Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2209863 A	(PHILIPS) see lines 17 to 24 of page 2 and lines 14 to 19 of page 3	1, 2, 5, 16, 17
X	GB 2203278 A	(SANYO) see line 8 of page 9 to line 14 of page 10	1, 2, 5, 7, 16, 17
X	EP 0514156 A2	(SPECTOR) see lines 49 to 58 of column 3 and lines 45 to 46 of column 4	1, 2, 7, 16, 17
X	EP 0422774 A2	(SHARP) see line 21 of column 5 to line 43 of column 6	1, 2, 13, 16, 17

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).